

The embodiments of the invention in which an exclusive property right or privilege is claimed are defined as follows:

1. A method for induction of articles onto one or more of a plurality of transport units having side by side article support capability, the transport units being movable along a continuous conveying path, said method comprising:

providing at least one induct for loading articles onto the transport units;

5 feeding articles to said at least one induct without respect to a destination of the articles and moving articles along said at least one induct toward the transport units in the order in which the articles were fed to said at least one induct;

determining a destination of articles at said at least one induct;

loading articles from said at least one induct to the transport units; and

10 resolving at least partial blocking conditions between the articles, said at least partial blocking conditions comprising an interference between two articles based on the destination of the two articles and the side of the conveying path or transport unit at which the two articles are positioned.

2. The method of claim 1, wherein providing at least one induct includes providing at least two inducts for loading articles onto the transport units from opposite sides of the conveying path.

3. The method of claim 2, wherein, in response to a full blocking condition, whereby the destinations of two articles are at opposite sides of the conveying path from the respective inducts of the articles, said method includes:

determining an induction priority for each of said inducts of the articles; and

5 resolving the full blocking condition by loading one of the articles and delay loading of the other of the articles as a function of the induction priority of said inducts.

4. The method of claim 3 including:

determining a last minute throughput value for each of said inducts in response to the induction priorities for said inducts being equal; and

resolving said full blocking condition by loading one of the articles as a function of
5 the induction priority and the last minute throughput value of the inducts.

5. The method of claim 1 further including providing at least two discharge ports at
opposite sides of the conveying path for receiving articles at their destinations.

6. The method of claim 1 including resolving said at least partial blocking conditions
by loading articles as a function of the destination and said blocking conditions of the
articles to limit unloading of either of the articles remote from their respective destination.

7. The method of claim 1 including resolving said blocking conditions by loading
articles as a function of the destinations of the articles and said blocking conditions to limit
recirculation of articles around the conveying path.

8. The method of claim 2 including:
providing at least one reinduction station along at least one side of the conveying
path, said at least one reinduction station being operable to receive articles from said
transport units and to reinduct articles onto said transport units.

9. The method of claim 8, wherein resolving blocking conditions includes resolving
said blocking conditions by unloading articles loaded onto a transport unit to said at least
one reinduction station and reloading articles from said at least one reinduction station onto
a transport unit as a function of the blocking condition and destination of articles loaded
5 onto said transport unit.

10. The method of claim 8 including providing at least one reinduction station
downstream from said at least one induct and upstream of the destinations of the articles,
said method including resolving said blocking conditions as a function of the destinations of
the articles and an availability of said at least one reinduction station.

11. The method of claim 10 including:
loading articles onto both sides of a respective one of the transport units; and

resolving said blocking conditions by unloading one of the articles from one side of the transport unit at said at least one reinduction station in response to a full or partial
5 blocking condition between the articles.

12. The method of claim 1 including determining a recirculation status of the system and resolving said blocking conditions as a function of the recirculation status.

13. The method of claim 1 including determining an upstream destination of the respective destinations for first and second articles and resolving said blocking conditions between the first and second articles as a function of the upstream destination.

14. The method of claim 1, wherein the transport units include side by side article supports which are independently operable to load, unload or transfer articles.

15. The method of claim 14, wherein the article supports comprise side by side carrier belts at each of the transport units.

16. A method for induction of articles onto one or more of a plurality of transport units having side by side article support capability, the transport units being movable along a continuous conveying path, said method comprising:

providing at least two inducts for loading articles onto the transport units;

5 feeding articles to said at least two inducts without respect to a destination of the articles and moving articles along said at least two inducts toward the transport units in the order in which the articles were fed to said at least two inducts;

determining a destination of articles at each of said at least two inducts;

loading articles from said at least two inducts to the transport units in a manner that
10 avoids at least partial blocking conditions between the articles, said at least partial blocking conditions comprising an interference between two articles based on the destination of the two articles and the side of the conveying path or transport unit at which the two articles are positioned.

17. The method of claim 16, wherein loading articles includes loading and delay loading articles onto the transport units.

18. The method of claim 17, wherein loading and delay loading of articles includes loading and delay loading of articles as a function of an induction priority status of said at least two inducts.

19. The method of claim 16 including providing at least one reinduction station downstream from said at least two inducts and upstream of the destinations of the articles, said method including resolving said blocking conditions as a function of the destinations of the articles and an availability of said at least one reinduction station.

20. The method of claim 19 including:
loading articles onto both sides of a respective one of the transport units; and
resolving said blocking conditions by unloading one of the articles from one side of the transport unit at said at least one reinduction station in response to a full or partial
5 blocking condition between the articles.

21. The method of claim 16 including determining a recirculation status of the system and resolving said blocking conditions as a function of the recirculation status.

22. The method of claim 16, wherein providing at least two inducts includes providing at least one induct for loading articles onto the transport units at each side of the conveying path.

23. The method of claim 22 including providing at least two discharge stations at opposite sides of the conveying path for unloading articles from the transport units.

24. The method of claim 16, wherein the transport units include side by side article supports which are independently operable to load, unload or transfer articles.

25. The method of claim 24, wherein the article supports comprise side by side carrier belts at each of the transport units.

26. A method for induction of articles onto one or more of a plurality of transport units having side by side article support capability, the transport units being movable along a continuous conveying path, said method comprising:

providing at least one induct for loading articles onto the transport units;

5 determining a destination of articles at said at least one induct;

loading articles from said at least one induct to the transport units;

providing at least one reinduction station downstream from said at least one induct and upstream of the destinations of the articles;

10 determining at least partial blocking conditions between articles loaded on a respective transport unit, said at least partial blocking conditions comprising an interference between two articles based on the destination of the two articles and the side of the transport unit at which the two articles are positioned; and

15 resolving at least some of said at least partial blocking conditions by discharging an article to said at least one reinduction station and reinducting that article from said at least one reinduction station onto a transport unit.

27. The method of claim 26, wherein resolving at least some of said at least partial blocking conditions includes resolving at least some of said at least partial blocking conditions as a function of an availability status of said at least one reinduction station.

28. The method of claim 26, wherein providing at least one induct includes providing at least two inducts at opposite sides of the conveying path.

29. The method of claim 28, wherein loading articles includes loading articles from said at least two inducts as a function of an induction priority status of said at least two inducts.

30. The method of claim 26 including unloading articles at destinations at opposite sides of the conveying path.

31. The method of claim 26, wherein the transport units include side by side article supports which are independently operable to load, unload or transfer articles.

32. The method of claim 26 including feeding articles to said at least one induct irrespective of the destination of the articles.

33. A method for induction of articles onto one or more of a plurality of transport units having side by side article support capability, the transport units being movable along a continuous conveying path of a sortation system, said method comprising:

providing at least two inducts for loading articles onto the transport units and
5 moving articles along said at least one induct toward the transport units in the order in which the articles are provided to said at least one induct;

determining destinations for the articles at said at least two inducts;

determining a loading sequence of the articles as a function of their respective destinations, said loading sequence including delaying loading of particular articles that may
10 create at least a partial blocking condition with another article, said at least partial blocking condition comprising an interference between two articles based on the destination of the two articles and the side of the conveying path at which the two articles are positioned; and

loading the articles from said at least two inducts onto the transport units according to said loading sequence.

34. The method of claim 33, wherein providing at least two inducts includes providing at least two inducts for loading articles onto the transport units from opposite sides of the conveying path.

35. The method of claim 33 including feeding articles to said at least two inducts irrespective of the destination of the articles.

36. The method of claim 33 further including providing at least two discharge ports at opposite sides of the conveying path for receiving articles at their destinations.

37. The method of claim 33, wherein loading the articles includes loading and delay loading of the articles onto the transport units.

38. The method of claim 37, wherein loading and delay loading of the articles includes loading and delay loading of the articles as a function of an induction priority status of said at least two inducts.

39. The method of claim 33 including providing at least one reinduction station along at least one side of the conveying path, said at least one reinduction station being operable to receive articles from said transport units and to reinduct articles onto said transport units.

40. The method of claim 39 including unloading articles loaded onto a transport unit to said at least one reinduction station and reloading articles from said at least one reinduction station onto a transport unit as a function of said blocking condition and destination of articles loaded onto said transport unit.

41. An article sortation system including a plurality of transport units having side by side article support capability, the transport units being movable along a continuous conveying path, said article sortation system comprising:

at least one induct for loading articles onto the transport units, said at least one induct receiving articles without respect to a destination of the articles and being operable to move articles toward the transport units in the order in which the articles were received by said at least one induct; and

a control which is operable to determine a destination of articles at said at least one induct, load articles from said at least one induct to the transport units, and resolve at least partial blocking conditions between the articles, whereby said at least partial blocking conditions comprising an interference between two articles based on the destination of the two articles and the side of the conveying path or transport unit at which the two articles are positioned.

42. The article sortation system of claim 41, wherein said at least one induct comprises at least two inducts positionable at opposite sides of the conveying path and which are operable to load articles onto the transport units from opposite sides of the conveying path.

43. The article sortation system of claim 42, wherein, in response to a full blocking condition, whereby the destinations of the articles are at opposite sides of the conveying path from the respective inducts of the articles, said control is further operable to determine an induction priority for each of said inducts of the articles and resolve said full blocking condition by loading one of the articles and delay loading of the other of the articles as a function of the induction priority of said inducts.

44. The article sortation system of claim 43, wherein said control is further operable to determine a last minute throughput value for each of said inducts in response to the induction priorities for said inducts being equal, said control being operable to resolve said full blocking condition by loading one of the articles as a function of the induction priority and the last minute throughput value of the inducts.

45. The article sortation system of claim 41 further including at least two discharge ports positionable at opposite sides of the conveying path for receiving articles at their destinations.

46. The article sortation system of claim 41, wherein said control is operable to resolve said blocking conditions by loading articles as a function of the destination and said blocking conditions of the articles to limit unloading of either of the articles remote from their respective destination.

47. The article sortation system of claim 41, wherein said control is operable to resolve said blocking conditions by loading articles as a function of the destinations of the articles and said blocking conditions to limit recirculation of articles around the conveying path.

48. The article sortation system of claim 41 including at least one reinduction station positionable along at least one side of the conveying path, said at least one reinduction

station being operable to receive articles from said transport units and to reinduct articles onto said transport units.

49. The article sortation system of claim 48, wherein said control is operable to resolve said blocking conditions by unloading articles loaded onto a transport unit to said at least one reinduction station and reloading articles from said at least one reinduction station onto a transport unit as a function of said blocking conditions and destination of articles loaded onto said transport unit.

50. The article sortation system of claim 48, wherein said at least one induction station is positionable downstream from said at least one induct and upstream of the destinations of the articles, said control being operable to resolve said blocking conditions as a function of the destinations of the articles and an availability of said at least one reinduction station.

51. The article sortation system of claim 50, wherein said control is operable to load articles onto both sides of a respective one of the transport units, and to resolve said blocking conditions by unloading one of the articles from one side of the transport unit at said at least one reinduction station in response to a full or partial blocking condition between the articles.

52. The article sortation system of claim 41, wherein said control is operable to determine a recirculation status of the system and resolve said blocking conditions as a function of the recirculation status.

53. The article sortation system of claim 41, wherein said control is operable to determine an upstream destination of the respective destinations for first and second articles and to resolve said blocking conditions between the first and second articles as a function of the upstream destination.

54. The article sortation system of claim 41, wherein the transport units include side by side article supports which are independently operable to load, unload or transfer articles.

55. The article sortation system of claim 54, wherein the article supports comprise side by side carrier belts at each of the transport units.

56. An article sortation system for inducting articles onto one or more of a plurality of transport units having side by side article support capability, the transport units being movable along a continuous conveying path, said article sortation system comprising:

at least two inducts for loading articles onto the transport units, said at least two inducts receiving articles without respect to a destination of the articles and being operable to move articles along said at least two inducts toward the transport units in the order in which the articles are received by said at least two inducts, said at least two inducts being positionable along the conveying path; and

a control which is operable to determine a destination of articles at each of said at least two inducts and to load articles from said at least two inducts to the transport units in a manner that avoids at least partial blocking conditions between the articles, said at least partial blocking conditions comprising an interference between two articles based on the destination of the two articles and the side of the conveying path or transport unit at which the two articles are positioned.

57. The article sortation system of claim 56, wherein said control is operable to load and delay loading of articles onto the transport units.

58. The article sortation system of claim 57, wherein said control is further operable to load and delay loading of articles as a function of an induction priority status of said at least two inducts.

59. The article sortation system of claim 56 including at least one reinduction station positionable downstream from said at least two inducts and upstream of the destinations of the articles, said control being operable to resolve said blocking conditions as a function of the destinations of the articles and an availability of said at least one reinduction station.

60. The article sortation system of claim 59, wherein said control is operable to load articles onto both sides of a respective one of the transport units, and to resolve said

blocking conditions by unloading one of the articles from one side of the transport unit at
said at least one reinduction station in response to at least a partial blocking condition
5 between the articles.

61. The article sortation system of claim 56, wherein said control is operable to
determine a recirculation status of the system and resolve said blocking conditions as a
function of the recirculation status.

62. The article sortation system of claim 56, wherein said at least two inducts comprises
at least one induct positionable at each side of the conveying path for loading articles onto
the transport units at a respective side of the conveying path.

63. The article sortation system of claim 62 including at least two discharge stations at
opposite sides of the conveying path for unloading articles from the transport units.

64. The article sortation system of claim 56, wherein the transport units include side by
side article supports which are independently operable to load, unload or transfer articles.

65. The article sortation system of claim 64, wherein the article supports comprise side
by side carrier belts at each of the transport units.

66. An article sortation system for inducting articles onto one or more of a plurality of
transport units having side by side article support capability, the transport units being
movable along a continuous conveying path, said article sortation system comprising:

at least one induct for loading articles onto the transport units, said at least one
5 induct being positionable along the conveying path;

a control which is operable to identify articles and determine a destination of articles
at said at least one induct; and

at least one reinduction station positionable downstream from said at least one induct
and upstream of the destinations of the articles;

10 wherein said control is further operable to determine at least partial blocking
conditions between articles loaded onto a respective transport unit, said at least partial

blocking conditions comprising an interference between two articles based on the destination of the two articles and the side of the transport unit at which the two articles are positioned, said control being further operable to resolve at least some of said at least
15 partial blocking conditions by discharging an article to said at least one reinduction station and reinducting that article from said at least one reinduction station onto a transport unit.

67. The article sortation system of claim 66, wherein said control is operable to resolve at least some of said at least partial blocking conditions as a function of an availability status of said at least one reinduction station.

68. The article sortation system of claim 66, wherein said at least one induct comprises at least two inducts positionable at opposite sides of the conveying path.

69. The article sortation system of claim 68, wherein said control is operable to load articles from said at least two inducts in response to an induction priority status of said at least two inducts.

70. The article sortation system of claim 66, wherein said control is operable to unload articles at destinations at opposite sides of the conveying path.

71. The article sortation system of claim 66, wherein the transport units include side by side article supports which are independently operable to load, unload or transfer articles.

72. The article sortation system of claim 66, wherein said at least one induct is operable to receive articles irrespective of the destination of the articles.

73. An article sortation system for inducting articles onto one or more of a plurality of transport units having side by side article support capability, the transport units being movable along a continuous conveying path of a sortation system, said article sortation system comprising:

5 at least two inducts which are operable to load articles onto the transport units and move articles along said at least two inducts toward the transport units in the order in which

the articles are provided to said at least two inducts, said at least two inducts being positionable along the conveying path;

10 a control which is operable to determine destinations for the articles at said at least two inducts and to determine a loading sequence of the articles as a function of their respective destinations, said control being operable to load or delay loading of particular articles that may create at least a partial blocking condition with another article in response to said loading sequence, said at least partial blocking condition comprising an interference between two articles based on the destination of the two articles and the side of the
15 conveying path at which the two articles are positioned, said control being operable to load or delay loading of the articles from said at least two inducts onto the transport units according to said loading sequence.

74. The article sortation system of claim 73, wherein said at least two inducts comprises at least two inducts positionable at opposite sides of the conveying path.

75. The article sortation system of claim 73, wherein said at least two inducts receive articles irrespective of the destination of the articles.

76. The article sortation system of claim 73 further including at least two discharge ports positionable at opposite sides of the conveying path for receiving articles from the transport units at the article destinations.

77. The article sortation system of claim 73, wherein said control is operable to load and delay loading of the articles in response to an induction priority status of said at least two inducts.

78. The article sortation system of claim 73 including at least one reinduction station positionable along at least one side of the conveying path, said at least one reinduction station being operable to receive articles from said transport units and to reinduct articles onto said transport units.

79. The article sortation system of claim 78, wherein said control is operable to unloading articles loaded onto a transport unit to said at least one reinduction station and to reload articles from said at least one reinduction station onto a transport unit in response to the blocking condition and destination of articles loaded onto said transport unit.

80. An article sortation system comprising:

an endless conveying path having a first side and a second side, said first side being generally opposite said second side;

a plurality of transport units which are movable along said conveying path, each of said transport units having at side by side article support capability;

a first induction station at said first side of said conveying path;

a second induction station at said second side of said conveying path, said first and second induction stations being operable to receive articles in a random order and to move the received articles toward said conveying path in the order in which the articles are received by said first and second induction stations;

at least one discharge station at each of said first and second sides of said conveying path, said plurality of transport units being operable to receive articles from said first and second induction station and to unload articles to said at least one discharge station; and

a control which is operable to determine a destination of the articles and a blocking condition between the articles, said blocking condition comprising an interference between two articles based on the destination of the two articles and the side of the conveying path or transport unit at which the two articles are positioned, said control being further operable to determine an appropriate discharge station for the articles and to load or delay loading of the articles from said first and second induction stations onto said transport units and to unload the loaded articles from said transport units to said appropriate discharge station in response to the destination of the articles and said blocking condition between a respective pair of articles.

81. The article sortation system of claim 80, wherein said at least one discharge station comprises a plurality of discharge stations corresponding to the destinations of articles being received by said first and second induction stations.

82. The article sortation system of claim 81, wherein said at least one discharge station further comprises at least one reinduction station positioned downstream from said first and second induction stations, said at least one reinduction station being operable to receive articles unloaded from said transport units and to reinduct the articles onto one of said transport units.

83. The article sortation system of claim 80, wherein said control is operable to load articles onto said transport units irrespective of the destinations of the articles.

84. The article sortation system of claim 80, wherein said control is operable to load an article received at said first induction station and to delay loading of another article received at said second induction station in response to the destinations of the articles and said blocking condition between the articles.

85. The article sortation system of claim 80, wherein said control is operable to determine available transport units of said transport units as said transport units approach said first and second induction stations, said control being further operable to load or delay loading articles in response to the availability of said transport units.

86. The article sortation system of claim 80, wherein said transport units comprise two side by side article supports.

87. The article sortation system of claim 86, wherein said side by side article supports are independently operable to load, unload or transfer articles.

88. The article sortation system of claim 87, wherein said side by side article supports comprise side by side carrier belts.

89. The article sortation system of Claim 88, wherein said carrier belts are movable in a direction which is orthogonal to said conveying path.